

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 September 2003 (18.09.2003)

PCT

(10) International Publication Number
WO 03/077365 A3

(51) International Patent Classification⁷: **H01Q 9/04**,
5/00, 1/24

(21) International Application Number: PCT/IB03/00746

(22) International Filing Date: 27 February 2003 (27.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
102 10 341.0 8 March 2002 (08.03.2002) DE

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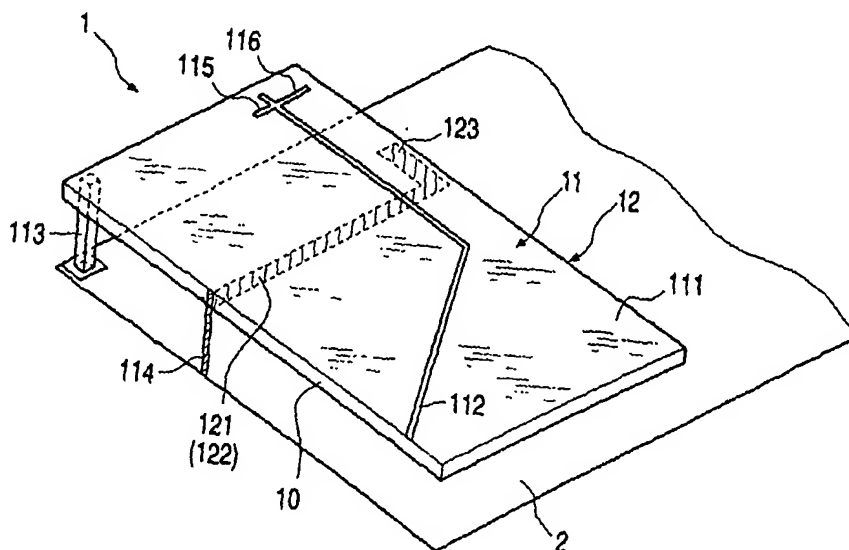
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(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,

[Continued on next page]

(54) Title: MULTIBAND MICROWAVE ANTENNA



(57) Abstract: A multiband microwave antenna (1) is described, which antenna is intended particularly for surface mounting (SMD) on a printed circuit board (PCB) and has a substrate (10) having at least a first and a second metallization structure (11, 12), wherein the first metallization structure (11) has at least a metal area (111) forming a resonator area and the second metallization structure (12) has at least a resonant printed conductor structure (121), thus enabling the antenna to combine the advantageous properties of a PIFA (planar inverted F-antenna) with those of a PWA (printed wire antenna).

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SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

13 November 2003

INTERNATIONAL SEARCH REPORT

Application No
PCT/IB 03/00746

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01Q9/04 H01Q5/00 H01Q1/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 777 295 A (NIPPON TELEGRAPH & TELEPHONE) 4 June 1997 (1997-06-04) the whole document	1-3,7-10
X	TEFIKU F ET AL: "DESIGN OF BROAD-BAND AND DUAL-BAND ANTENNAS COMPRISED OF SERIES-FEDPRINTED-STRIP DIPOLE PAIRS" IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, IEEE INC. NEW YORK, US, vol. 48, no. 6, June 2000 (2000-06), pages 895-900, XP000959047 ISSN: 0018-926X the whole document	1,2
X	EP 1 003 240 A (MURATA MANUFACTURING CO) 24 May 2000 (2000-05-24) abstract; figures	1,3,7-10
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

2 June 2003

Date of mailing of the international search report

05.09.03

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/00746

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 447 218 A (HUGHES AIRCRAFT CO) 18 September 1991 (1991-09-18) abstract; figures 4-8 ---	1-3,7-10
X	US 6 339 405 B1 (GLEENER ANDREY) 15 January 2002 (2002-01-15) abstract; figures -----	1,2,9,10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 03/00746

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3, 7-10

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-3,7-10

1.1. Claims: 1,2,7-10

A multiband antenna with two metallization structures that are applied to opposed main faces of a parallelepiped substrate

1.2. Claims: 1,3,7-10

A multiband antenna with two metallization structures that is arranged above a metallized plate

2. Claims: 1,4,5,7-10

A multiband antenna with two metallization structures where one metallization structure has a slot structure to enable two resonant frequencies to be excited

3. Claims: 1,6,7-10

A multiband antenna with two metallization structures where a part of one metallization structure is provided with a tuning slot

INTERNATIONAL SEARCH REPORT

 In application No
 PCT/IB 03/00746

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0777295	A	04-06-1997	CA 2190792	A 30-05-1997
			CN 1159664	A, B 17-09-1997
			DE 69628392	D 03-07-2003
			JP 3185856	B 11-07-2001
			JP 9214244	A 15-08-1997
			US 5917450	A 29-06-1999

EP 1003240	A	24-05-2000	JP 3351363	B 25-11-2002
			JP 2000151258	A 30-05-2000
			CA 2267533	C 08-05-2001
			CN 1254202	A 24-05-2000
			KR 2000035069	A 26-06-2000
			US 6100849	A 08-08-2000

EP 0447218	A	18-09-1991	US 5043738	A 27-08-1991
			CA 2035975	C 17-01-1995
			DE 69119275	D 13-06-1996
			DE 69119275	T 19-12-1996
			JP 2569230	B 08-01-1997
			JP 7046033	A 14-02-1995

US 6339405	B	15-01-2002	WO 02095875	A 28-11-2002